

SUBSTRATE GUIDELINES FOR STRATASEAL HR

This Technical Reference provides the substrate guidelines for the installation of STRATASEAL HR hot fluid applied waterproofing membrane. Refer to the specific substrate(s) applicable to the project. For substrates not referenced herein, contact CETCO for guidelines.

Concrete (Cast-In-Place)

There are several different types of concrete (cast in place) used in construction: Structural Weight, Lightweight Structural Weight, and Lightweight Insulating Weight concrete. Some are acceptable substrates for STRATASEAL HR, others are not acceptable substrates. In general CETCO is looking for a concrete substrate that has a minimum compressive strength of 17.2 MPa (2,500 lbs/in²) with a density no less than 1442 kg/m³ (90 lbs/ft³). Frequent bond checks should be conducted initially and throughout the application of STRATASEAL HR to verify that a good bond is being obtained to the substrate.

- **Structural Weight Concrete:** Structural weight concrete is an acceptable substrate for STRATASEAL HR. Made with aggregates such as sand, gravel and crushed stone, structural weight concrete will have a density of 2162.5- 2563 kg/m³ (135-160 lbs/ft³), and will retain 3% to 5% moisture by volume when fully cured; an ideal substrate for STRATASEAL HR. CETCO recommends a cure/drying time of 28 days, 14 days minimum. Depending on conditions (i.e., ambient temperature, humidity, no precipitation, etc...) the concrete may be dry enough to receive application of the membrane in less than the CETCO recommendation.
- **Lightweight Structural Weight:** Lightweight structural concrete is an acceptable substrate for STRATASEAL HR with certain limitations such as a longer drying time than structural weight concrete. Made with aggregates such as expanded shale, clay, slate or slag, lightweight structural concrete will have a density of 1442-1842 kg/m³ (90-115 lbs/ft³), and will retain 5% to 20% moisture by volume when fully cured. Due to the high moisture content of lightweight structural concrete, a cure/drying time of 60 days is recommended, with a 28 day minimum, before application of the membrane is to begin.
- **Lightweight Insulating Weight and/or Cellular Concrete (UNACCEPTABLE):** Lightweight insulating concretes and /or cellular concrete are NOT acceptable substrates for STRATASEAL HR. These are made with aggregates such as vermiculite, perlite, pumice, scoria or diatomite, lightweight insulating concrete will have a density of 240-1442 kg/m³ (15-90 lbs/ft³) and will retain more than 20% moisture by volume when fully cured. This high moisture content can create bonding and inholing/blistering problems for the membrane and the low density (less than 1762 kg/m³, 110 lbs/ft³) may create bonding problems due to the weak, non-durable surface that results. These factors make it an unacceptable substrate for STRATASEAL HR.

Concrete Surface Finish

A poured in place concrete surface (horizontal) should be finished to a broom texture to provide a "mechanical" bond for the membrane. The texture however, should not be so rough that the membrane cannot be applied at a continuous thickness across the surface. As a minimum, a wood float or broom finish is required, with a wood-troweled finish preferred. A steel-troweled finish is NOT desirable substrate due to the smoothness of the finish. Excessive "bleeding" is caused by over-troweling increases the water/cement ratio near the concrete surface, which can result in a weak top layer with poor durability. This thin weak layer is commonly referred to as 'laitance'. This is particularly likely to occur if finishing operations take place while bleed water is present. This weak concrete surface can inhibit the bond of STRATASEAL HR to the concrete and must be removed.

Concrete Curing Techniques

Probably the most important factor in assuring that the concrete will attain its greatest strength and durability is the extent to which it has cured. The curing process, known as hydration, is especially critical during the first few days when the evaporation of water from the concrete is greatest. During this time, it is important to retain as much water within the concrete as possible. Several methods are commonly used for doing this:

- **Water Curing:** Water curing is probably the most effective curing method. However, close continuous supervision is required to make sure that cycles between wetting and drying of the concrete are absolutely avoided. Water curing can be accomplished by "ponding", which covers the slab with water held in place by a dike around the perimeter. "Spraying" or "Fogging" of the concrete keeps it wet through a system of hoses and nozzles that soak the concrete surface with a continual spray or mist of water.
- **Wet Coverings:** Burlap fabric has been successfully used to keep a concrete surface wet during curing. The burlap must be carefully placed, leaving no concrete exposed, and then kept wet. Other wet coverings include earth, sand, hay, straw and sawdust. However, they are messy and more labor intensive, and therefore less practical. The wet covering method also poses a special risk. If allowed to dry out, these materials can actually act as a blotter and speed up the drying of the concrete.
- **Paper Sheets:** Paper sheets are a third method of curing concrete. Water-pervious papers require the periodic addition of water to replace water lost through evaporation. Impervious papers require no additional water, acting as a vapor barrier and thereby preventing evaporation of the mix water. With both types of paper, the concrete surface should be thoroughly wetted before they are applied. The sheets should overlap by several inches and must be weighted in place to insure close contact with the concrete surface.
- **Plastic Sheets:** Similar to water-impervious paper sheets, plastic sheets form a vapor barrier that seals moisture in. Light weight (as little as 9 kg/93 m², 20 lb/1,000 ft²) makes plastic extremely practical and highly labor efficient. The sheets should overlap by several inches and must be weighted in place to insure close contact with the concrete surface.
- **Liquid Membrane Curing Compounds:** Liquid membrane curing compounds have become increasingly popular due to their ease of application and low material cost. Some are suitable for use when STRATASEAL HR is to be used, while others should be avoided. Ideally, STRATASEAL HR is best applied when traditional methods of concrete curing have been used (i.e. water curing, wet coverings, paper and plastics sheets). Most liquid membrane curing compounds are normally applied with a hand-held or power sprayer after the concrete has received its final finish and the water sheen on its surface has disappeared.

The timing of the application is very critical. If the compound is applied when standing water is present, it will not be able to form the continuous film necessary to prevent evaporation of the water and weak, improperly cured concrete results. If the curing compound is applied to a surface which has lost some of its mix water, it will be absorbed into the concrete and the result will be equally weak and improperly cured concrete. (Fortunately, when concrete surface has lost some of the mix water, it can be fogged down to seal the pores before the curing compound is applied). Normally, a single application of a liquid membrane curing compound is applied according to the product manufacturer's specification. However, two lighter applications applied at right angles to each other can better assure complete coverage - reducing the chances that the material will pond in some areas while being missed altogether in others. In addition, many manufacturers suggest that lighter applications be applied when a subsequent material (like STRATASEAL HR) is to be applied to the concrete.

Conventional liquid membrane curing compounds of wax or resin bases only provide a curing function, synthetic products may also harden, seal and dustproof a concrete surface.

The following details these products in relationship to their use with STRATASEAL HR:

The use of any liquid membrane curing compound in conjunction with STRATASEAL HR must be approved in advance and IN WRITING by CETCO on a project by project basis. Consult the Field Services Department of CETCO when a liquid membrane curing compound is intended for use.

- **Sodium Silicate Based Curing Compounds:** These compounds are recommended above any other liquid membrane curing compound for use with STRATASEAL HR because they generally leave no film or residue (when properly applied) which can interfere with the ability of STRATASEAL HR to bond to the concrete surface. These compounds react with the free lime and other materials in the concrete mix to form an insoluble gel within the pores of the concrete, which greatly retards the evaporation of the mix water and provides a hard, dust-proof surface.
- **Resin Based Curing Compounds:** (cure only) These compounds form a film which can take 45-60 days to oxidize and flake off when exposed to the elements and foot traffic. A questionable bond is achieved between STRATASEAL HR and the concrete as long as the film is present. It can however, be removed by brushing down the surface with a wire brush, or washing the surface with a light solution of muriatic acid or trisodium phosphate (TSP). The surface should then be rinsed and allowed to dry before application of STRATASEAL HR. Provided the film is TOTALLY removed prior to the application of STRATASEAL HR, resin based compounds may be acceptable. Frequent bond checks should be conducted initially and throughout the application of STRATASEAL HR to verify that a good bond is being obtained.
- **Wax Based Curing Compounds (UNACCEPTABLE):** (cure only) Wax based compounds ARE NOT ACCEPTABLE. These compounds cease to be effective as curing agents after about 28 days, yet take from 90 to 120 days to dissipate when exposed to the elements and traffic. The wax residue or film is difficult to remove and will interfere with the bond of STRATASEAL HR to the concrete.
- **Wax/Resin Based Curing Compounds (UNACCEPTABLE):** (cure only) Wax/resin based curing compounds ARE NOT ACCEPTABLE. These compounds are NOT suitable for use on concrete that is to receive a subsequent application of STRATASEAL HR. The wax component of this compound inhibits the adhesion of any future coating for the concrete.
- **Acrylic and Chlorinated Rubber Based Curing Compounds (UNACCEPTABLE):** Acrylic and chlorinated rubber based compounds ARE NOT ACCEPTABLE. These compounds leave a permanent film on the surface which may prevent STRATASEAL HR from achieving an adequate bond with the concrete surface.

Form Release Agents:

Form release agents are used to prevent concrete form sticking to the form work and facilitate faster and cleaner stripping of the forms. Typically these release agents are spray applied to the forms prior to their erection. Form release agents over-applied to a form may transfer to the concrete's surface cast against it. This could cause problems for STRATASEAL HR from the standpoint of achieving a good bond to the concrete surface.

CETCO does not recommend the use of any petroleum, wax, resin or silicone-based form release agents, due to the potential adhesion problem if this agent should transfer to the concrete's surface.

Some manufacturers of form release agents do claim, however, that their products will provide a concrete surface free of residue that would impair the bond of paint or other subsequent concrete coating materials, provided their product is applied according to their specifications. Strict compliance to the manufacturers' specified application rate is critical. If a form release agent transfers to the concrete surface the agent **MUST** be removed, as recommended by the manufacturer of the agent, prior to the application of the STRATASEAL HR. Frequent bond checks should be conducted initially and throughout the application of STRATASEAL HR to verify that a good bond is being obtained.

Precast Concrete

Precast concrete is typically made of structural weight concrete and is generally an acceptable substrate for the application of STRATASEAL HR. Filling and/or reinforcing of the joints between individual precast panels is typically required. This type of installation generally requires a fabric reinforced membrane assembly, where one coat of membrane is applied to the precast concrete units at a minimum thickness of 2.3mm (90 mils) thick into which a layer of STRATABOND 100 (spunbonded polyester) fabric is embedded; followed by another coat of membrane at 3.2mm (125 mils) minimum per CETCO guidelines.

Concrete Masonry Units

Concrete masonry units (CMUs) are an acceptable substrate for STRATASEAL HR. CMU is typically used in foundation walls, planter walls, parapets, etc. This type of installation requires a fabric reinforced membrane assembly, where one coat of membrane is applied to the concrete block units at a minimum thickness of 2.3mm (90 mils) thick into which a layer of STRATABOND 100 (spunbonded polyester) fabric is embedded; followed by another coat of membrane at 3.2mm (125 mils) minimum per CETCO guidelines. Best practice is to strike the mortar joints flush with the exterior face of the masonry units to create a uniform surface plan to receive the waterproofing membrane.

If the concrete block units are first parged with concrete to a thickness of 13mm (1/2") minimum, the standard membrane assembly of a single 4.6mm (180 mil) thick coat would be adequate. Parge coat needs to be allowed to cure (dry) before STRATASEAL HR can be applied.

Wood Plank

Wood plank is an acceptable substrate for STRATASEAL HR per the following guidelines. Wood plank minimum thickness 19mm (3/4"). Tongue and groove joints are required. Adequate structural support is required to limit deflection and movement between planks. Wood must be free of any special chemical treatments or other applications which would affect STRATASEAL HR's ability to bond to it.

Wood plank substrate installation requires a fabric reinforced membrane assembly, where one coat of membrane is applied to the wood plank at a minimum thickness of 2.3mm (90 mils) thick, into which a layer of STRATABOND 100 (spunbonded polyester) fabric is embedded; followed by another coat of membrane at 3.2mm (125 mils) minimum per CETCO guidelines.



Plywood Decking

Plywood is an acceptable substrate for STRATASEAL HR per the following guidelines. Minimum plywood thickness is 13mm (1/2"). Tongue and groove joints are required. Adequate structural support is required to limit deflection and movement between plywood joints. Wood must be free of any special chemical treatments or other coating applications, which could affect the bonding performance of STRATASEAL HR. A plywood substrate installation requires a fabric reinforced membrane assembly, where one coat of membrane is applied to the plywood at a minimum thickness of 2.3mm (90 mils) thick, into which a layer of STRATABOND 100 (spunbonded polyester fabric) is embedded; followed by a second coat of membrane at 3.2mm (125 mils) minimum per CETCO guidelines.

OSB Board Decking

OSB Board is an acceptable substrate for STRATASEAL HR per the following guidelines. Minimum OSB Board thickness is 16mm (5/8"). All OSB Board edges shall be tightly abutted together with all board joints positioned over adequate structural support. Adequate structural support is required to limit deflection and movement between OSB Board joints. OSB Board must be free of any special chemical treatments or other coating applications, which could affect the bonding performance of STRATAPRIME and STRATASEAL HR. Test bonding performance prior to application of membrane. A OSB Board substrate installation requires a fabric reinforced membrane assembly, where one coat of membrane is applied to the primed OSB Board at a minimum thickness of 2.3mm (90 mils) thick, into which a layer of STRATABOND 100 (spunbonded polyester fabric) is embedded; followed by a second coat of membrane at 3.2mm (125 mils) minimum per CETCO guidelines.

Gypsum Board over Metal Decking

Gypsum board over metal decking is an acceptable substrate for STRATASEAL HR. Gypsum board must be fire rated type X board, minimum 16mm (5/8") thickness. Both traditional paper-faced and fiberglass-faced products with treated cores are acceptable. The gypsum board must be mechanically fastened to minimum 22 gauge metal decking with appropriate screw type fasteners as directed by project specifications or local building codes. At a minimum there should be one fastener per 0.2 m² (2 ft²) of board (a 1.2m x 2.4m or 4ft x 8ft board would have 16 fasteners). Adequate structural support is required to limit deflection and movement.

Gypsum board over metal decking installation requires a fabric reinforced membrane assembly, where one coat of membrane is applied to the gypsum board at a minimum thickness of 2.3mm (90 mils), into which a layer of STRATABOND 100 (spunbonded polyester) fabric is embedded, followed by another coat of membrane at 3.2mm (125 mils) minimum thickness.

Pre-strip the gypsum board joints with 1.5mm (60 mils) of STRATASEAL HR membrane reinforced and 150mm (6") wide strip of STRATABOND 100 fabric prior to the application of the 5.5mm (215 mil) Strataseal HR membrane assembly.

Flat Metal

An acceptable substrate (flat metal sections not ribbed decking) for STRATASEAL HR. Metal surface must be free of oil, rust, paint or coatings which may inhibit the bond of the STRATASEAL HR membrane.

Poured-In-Place Gypsum (UNACCEPTABLE)

Poured in place gypsum is not an acceptable substrate for STRATASEAL HR.